IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventors: Jane M. Simmons, et al.

Title: Optical Transmission Systems, Devices, and Methods

Serial No.:		Docket No.:	990823PCT-US
Filing Date:	Feb. 22, 2002	Art Unit:	
Group No.:		Examiner:	

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Please amend the application as follows.

In the Specification

On page 1, after the title, please insert the following sections:

-- CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of U.S. Patent Application Serial No. 09/119,562, filed July 21, 1998, and this application claims priority from PCT application PCT/US00/23051, filed August 23, 2000, which claims priority from US Provisional application Serial No. 60/150,218, filed August 23, 1999, all of which are incorporated herein by reference.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not Applicable.--

In the Claims

Please delete claims 1-20.

Please add the following new claims:

--21. (New) A wavelength division multiplexed optical communications network, comprising:

a plurality of spectral group routers through which optical signals can pass without undergoing an optical to electrical to optical conversion;

optical communication paths optically connecting the nodes;

means for configuring a plurality of connections in the network into a plurality of spectral groups, wherein configuring the plurality of connections includes:

routing each connection from a source node to a destination node;

partitioning each of a plurality of the connections into a plurality of subconnections; and

forming spectral groups for connections and subconnections that are routed on identical paths.

22. (New) The network of claim 21, wherein at least one of the spectral group routers is an all-optical switch including at least three ports, wherein each port is connected to a different optical communications path, and wherein optical signals entering one port can be selectively output at another port without undergoing an optical to electrical to optical conversion.

23. (New) The network of claim 22, wherein the optical switch selectively switches signals in groups of one or more spectral groups.

24. (New) The network of claim 23, wherein at least one of the spectral group routers is an all-optical add/drop multiplexer including a first port, a second port, an add port, and a drop port, wherein at least a portion of the optical signals entering the first port can be output at the second port without an optical to electrical to optical conversion, and wherein at least a portion of the optical signals can be selectively output at the drop port, and wherein additional signals provided at the add port can be output at the second port.

25. (New) The network of claim 24, wherein the add/drop multiplexer selectively drops signals in groups of one or more spectral groups.

26. (New) The network of claim 21, wherein the means for configuring a plurality of connections includes a network management system.

27. (New) The network of claim 26, wherein the network management system utilizes an optical waveband hierarchy which includes a network management level, and wherein the means for configuring a plurality of connections is resident at the network management level of the optical waveband hierarchy.

28. (New) The network of claim 26, wherein one of the spectral group routers further comprises:

a plurality of waveband demultiplexers, each having an input port connected to an optical communications path, and a plurality of output ports;

a plurality of optical signal splitters, each optical signal splitter having an input port connected to one of the output ports of one of the waveband demultiplexers, and each optical signal splitter having a plurality of output ports;

a plurality of waveband selectors, each connected to one of the output ports of the optical signal splitters;

a plurality of optical signal couplers, each optical signal coupler having a plurality of input ports, each connected to one of the waveband selectors, and each optical signal splitter having an output port; and

a plurality of waveband multiplexers, each having a plurality of input ports, each input port connected to one of the output ports of the optical signal couplers, and each having an output port connected to an optical communications path.

29. (New) The network of claim 26, wherein after forming spectral groups, the network management system performs a method of:

determining whether any of the spectral groups exceed a maximum capacity of the spectral groups; and

converting spectral groups that exceed the maximum capacity of the spectral groups into two or more spectral groups that do not exceed the maximum capacity of the spectral groups.

30. (New) The network of claim 26, wherein after converting spectral groups the network management system performs a method of:

determining whether the number of spectral groups exceeds the maximum number of available spectral groups;

combining spectral groups when the number of spectral groups exceeds the maximum number of available spectral groups, wherein combining includes adding the connections and/or subconnections from at least two spectral groups into a combined spectral group, so that the combined spectral group includes connections and/or subconnections that are not routed on identical paths.

31. (New) The network of claim 30, wherein combining spectral groups includes performing at least one of subsetting operations, merging operations, and branching operations.

32. (New) The network of claim 31, wherein the spectral groups each include at least one connection or subconnection and wherein the spectral groups have a maximum capacity of connections and subconnections that can be carried in a single spectral group, and wherein combining spectral groups includes:

determining a minimum fill rate for a combined spectral group;

determining whether a first spectral group can be combined with a second spectral group according to predetermined criteria, wherein the criteria includes:

the first spectral group is a sub-set of the second spectral group;

a fill rate of the combined spectral group is at least equal to the minimum fill rate;

the combined spectral group includes a total number of connections and subconnections that are equal to or less than the maximum capacity for a single spectral group; and

combining spectral groups that satisfy the predetermined criteria.

33. (New) The network of claim 31, wherein the spectral groups each include at least one of a connection and a subconnection, and wherein the spectral groups have a maximum capacity of connections and subconnections that can be carried in a single spectral group, and wherein combining spectral groups includes:

determining a minimum fill rate for a combined spectral group;

determining whether a first spectral group can be combined with a second spectral group according to predetermined criteria, wherein the criteria includes:

the first and second spectral groups overlaps at opposite ends;

a fill rate of the combined spectral group is at least equal to the minimum fill rate;

the combined spectral group includes a total number of connections and subconnections that are equal to or less than the maximum capacity for a single spectral group; and

combining spectral groups that satisfy the predetermined criteria.

34. (New) The network of claim 31, wherein the spectral groups each include at least one connection and/or subconnection and wherein the spectral groups have a maximum capacity of connections and subconnections that can be carried in a single spectral group, and wherein combining spectral groups includes:

determining a minimum fill rate for a combined spectral group;

determining whether a first spectral group can be combined with a second spectral group according to predetermined criteria, wherein the criteria includes:

the first and second spectral groups overlap and the first spectral group extends beyond the second spectral group at a location other then an end of the second spectral group;

a fill rate of the combined spectral group is at least equal to the minimum fill rate;

the combined spectral group includes a total number of connections and subconnections that are equal to or less than the maximum capacity for a single spectral group; and

combining spectral groups that satisfy the predetermined criteria.

35. (New) A wavelength division multiplexed optical communications network, comprising:

a plurality of spectral group routers through which optical signals can pass without undergoing an optical to electrical to optical conversion;

optical communication paths optically connecting the nodes and forming a plurality of links;

means for organizing the optical network, wherein organizing the optical network includes:

defining a plurality of spectral groups, wherein each spectral group includes at least one link, and at least one spectral group includes a plurality of links;

assigning a plurality of signal channels to the at least one spectral group including a plurality of links, wherein at least one of the signal channels is assigned to less than all of the links in the spectral group.

36. (New) The network of claim 35, wherein the means for organizing the optical network includes a network management system.

37. (New) The network of claim 36, wherein defining a plurality of spectral groups includes:

routing a plurality of signal channels from a source to a destination to form a plurality of connections;

partitioning each of at least one connection into a plurality of subconnections; and

forming spectral groups for connections and subconnections that are routed on identical paths.

38. (New) The network of claim 37, further comprising after forming a spectral group:

determining whether any of the spectral groups exceed a maximum capacity of the spectral groups;

converting spectral groups that exceed the maximum capacity of the spectral groups into two or more spectral groups that do not exceed the maximum capacity of the spectral groups.

39. (New) The network of claim 38, further comprising after converting spectral groups:

determining whether the number of spectral groups exceeds a maximum number of available spectral groups;

combining spectral groups when the number of spectral groups exceeds the maximum number of available spectral groups, wherein combining includes adding connections and subconnections from at least two spectral groups into a combined spectral group, so that the combined spectral group can include connections and subconnections that are not routed on identical paths.

40. (New) A wavelength division multiplexed optical communications network, comprising:

a plurality of spectral group routers through which optical signals can pass without undergoing an optical to electrical to optical conversion;

optical communication paths optically connecting the nodes and forming a plurality of links;

a network management system for organizing the network, wherein organizing the network includes:

routing a plurality of signal channels from a source to a destination to form a plurality of connections;

partitioning each of at least one connection into a plurality of subconnections;

forming spectral groups for connections and subconnections that are routed on identical paths;

determining whether any of the spectral groups exceed a maximum capacity of the spectral groups;

converting spectral groups that exceed the maximum capacity of the spectral groups into at least two spectral groups that do not exceed the maximum capacity of the spectral groups;

determining whether the number of spectral groups exceeds a maximum number of available spectral groups;

combining spectral groups when the number of spectral groups exceeds the maximum number of available spectral groups, wherein combining includes adding connections and subconnections from at least two spectral groups into a combined spectral group; and

assigning a plurality of connections and subconnections to the at least one spectral group including a plurality of links, wherein at least one of the subconnections and connections is assigned to less than all of the links in the spectral group.--

REMARKS

The specification has been amended to add a cross reference to related applications and to include a statement regarding federally sponsored research and development. The original claims have been cancelled and new claims have been added. A separate paper entitled "§1.121(c)(1)(ii) ATTACHMENT TO PRELIMINARY AMENDMENT" is included herewith.

The Examiner is requested to contact the undersigned if there are any questions regarding the amendments.

Respectfully submitted,

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§1.121(c)(1)(ii) ATTACHMENT TO PRELIMINARY AMENDMENT

Two new sections were inserted on Page 1, after the title.

Original claims 1-20 were deleted.

New claims 21-40 have been added.